



## UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/728,239	12/03/2003	Jean-Paul Mardon	12928/100021	7506
23280	7590	08/18/2008	EXAMINER	
Davidson, Davidson & Kappel, LLC			ROE, JESSIE RANDALL	
485 7th Avenue			ART UNIT	PAPER NUMBER
14th Floor			1793	
New York, NY 10018				
MAIL DATE		DELIVERY MODE		
08/18/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/728,239	<b>Applicant(s)</b> MARDON ET AL.
	<b>Examiner</b> Jessee Roe	<b>Art Unit</b> 1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 27 May 2008.

2a) This action is FINAL.      2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-7 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 1-7 is/are rejected.

7) Claim(s) 1 is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_

4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date \_\_\_\_\_

5) Notice of Informal Patent Application  
 6) Other: \_\_\_\_\_

**DETAILED ACTION**

***Status of the Claims***

Claims 1-7 are pending wherein claim 1 is amended.

***Claim Objections***

Claim 1 is objected to because of the following informalities: The recitation "A zirconium based alloy comprising a zirconium base" is redundant. Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mardon et al. (US 5,648,995) with evidence from Easterday (Zirconium Analysis by Production Control Quantometer) in view of Rebeyrolle et al. (US 5,832,050).

In regards to claims 1-3, Mardon et al. ('995) disclose (abstract) a zirconium based alloy that is made into tubing sheaths (sheet) for nuclear fuel rods as shown in the table on the following page.

Element	From Instant Claims (weight percent)	Mardon et al. ('995) (weight percent)	Overlapping range (weight percent)
Fe	Must be present	50 – 250 ppm	50 – 250 ppm
Cr	-	-	-
V	-	-	-
Fe+Cr+V	200 – 700 ppm	50 – 250 ppm	200 – 250 ppm
Nb	0.8 – 1.3	0.8 – 1.3	0.8 – 1.3
C	0 – 100 ppm	0 – 200 ppm	0 – 100 ppm
S	10 – 35 ppm	-	-
Si	0 – 50 ppm	0 – 120 ppm	0 – 50 ppm
O	1100 – 1700 ppm	0 – 1600 ppm	1100 – 1600 ppm
Sn	>0 – 100 ppm	-	-
Zr	remainder	remainder	remainder

Mardon et al. ('995) disclose the elements as shown in the table above, but Mardon et al. ('995) do not specify the amounts of chromium, vanadium, and sulfur.

Easterday discloses that zirconium would contain 20-450 ppm chromium, 20-50 ppm vanadium and 20-50 ppm tin as impurities (Table III and page 1867, 1<sup>st</sup> column, and page 1868, 3<sup>rd</sup> column).

Therefore, it would be expected that the zirconium in the zirconium alloy disclosed by Mardon et al. ('995) would contain 20-450 ppm chromium, 20-50 ppm vanadium and 20-50 ppm tin, as disclosed by Easterday because Easterday teaches that chromium and vanadium would be present in zirconium as impurities (Table 3 and page 1867, 1<sup>st</sup> column, and page 1868, 3<sup>rd</sup> column).

Still regarding claims 1 and 2, Rebeyrolle et al. ('050) disclose adding 8-30 ppm sulfur to zirconium-based alloys made into tubing sheaths for nuclear reactors in order to improve creep, uniform corrosion, and nodular corrosion behaviors without negatively impacting mechanical and formability properties (abstract, col. 8, lines 1-40 and claims 1-2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add 8-30 ppm sulfur, as disclosed by Rebeyrolle et al. ('050), to the zirconium-based alloy, as disclosed by Mardon et al. ('995) with evidence from Easterday, in order to improve creep, uniform corrosion, and nodular corrosion behaviors without negatively impacting mechanical and formability properties, as disclosed by Rebeyrolle et al. ('050) (abstract, col. 8, lines 1-40 and claims 1-2).

With respect to the limitation "at least the greater part of iron being in the form of  $Zr(Nb,Fe,Cr)_2$  or  $Zr(Nb,Fe,V)_2$  and which the intermetallic compounds are of a size not exceeding 200 nm." of claim 2 and in regards to feature "wherein the intermetallic compounds are of a size exceeding 100 nm" of claim 7, the Examiner asserts that these characteristics would be present in the zirconium alloy disclosed by Mardon et al. ('995) with evidence from Easterday, in view of Rebeyrolle et al. ('050) because Mardon et al. ('995) disclose a treatment process (abstract) that would be substantially similar to that of the instant invention as shown below. MPEP 2112.01 I.

	<u>Mardon et al. ('995)</u> (col. 3, lines 1-40)	<u>Instant Invention</u>
1 <sup>st</sup> Step	quenching after heating to 1050°C	quenching after heating to 1000-1200 °C
2 <sup>nd</sup> Step	extruding after heating to 650°C	extruding after heating to 600-800°C
3 <sup>rd</sup> Step	rolling at 580°C	rolling between 560-620°C
4 <sup>th</sup> Step	final heat treatment of 580°C	final heat treatment between 560-620°C

In regards to claims 4-6, Easterday teaches (Table III) that 20-450 ppm chromium and 20-50 ppm vanadium would be present in zirconium as an impurity. Mardon et al. ('995) disclose that the range of iron would be from 50-250 ppm.

Therefore, it would be expected that the quantities of iron, chromium, and vanadium in the zirconium-base alloy of Mardon et al. ('995) with evidence from Easterday would overlap the ratio range of 0.5 and 30 of chromium and vanadium to iron of the instant invention. It is well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art, *In re Cooper and Foley* 1943 C.D. 357, 553 O.G. 177; 57 USPQ 117, *Taklatwalla v. Marburg*, 620 O.G. 685, 1949 C.D. 77, and *In re Pilling*, 403 O.G. 513, 44 F(2) 878, 1931 C.D. 75. In absence of evidence to the contrary, the selection of the proportions of elements would appear to require no more than routine investigation by those of ordinary skill in the art. *In re Austin, et al.*, 149 USPQ 685, 688. It would have been obvious to one of ordinary skill in the art to select the desired amounts iron, chromium, and vanadium from the ranges disclosed by Mardon et al. ('995) with evidence from Easterday such that the ratio would be satisfied because Mardon et al. ('995) with evidence from Easterday disclose the same utility (zirconium-based alloys) throughout the disclosed ranges.

#### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422

Art Unit: 1793

F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-2 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 9 and of US Patent No. 6,863,745. Although the conflicting claims are not identical, they are not patentably distinct from each other because in claim 1 of the instant invention, the zirconium-based alloy composition used for the guide tubes of nuclear reactors as shown US Patent No. 6,863,745 compares to the instant invention as follows:

<b>Element</b>	<b>From Instant Claims</b>	<b>US Patent 6,863,745 (claim 9)</b>	<b>Overlapping range</b>
Fe	-	0.02-1% (200 - 10000 ppm)	
Cr	-	0.01-0.25% w/o V (100 - 2500 ppm)	-
V	-	0.01-0.25% w/o Cr (100 - 2500 ppm)	-
Fe+Cr+V	200 - 700 ppm	400 - 15000 ppm	400 - 700 ppm
Nb	0.8%-1.3%	0.8%-1.3%	0.8%-1.3%
C	less than 100 ppm	less than 100 ppm	less than 100
S	10 - 35 ppm	5 - 35 ppm	10 - 35 ppm
Si	less than 50 ppm	-	0 ppm
O	1100 -1700 ppm	less than 2000 ppm	1100 - 1700 ppm
Zr	remainder	remainder	remainder

It would be obvious that the equation  $(Nb-0.3)/(Fe + Cr + V) > 2.5$  would be satisfied for the instant invention. For example, if Nb = 0.8%, Fe = 0.02% (200 ppm), Cr = 0.01 (100 ppm), and V = 0%, then the result is 16.67 which is greater than 2.5.

In regards to claim 2 of the instant invention, the zirconium-based alloy compositional comparison is shown above. The comparison of the processes used to

make the zirconium-based alloy are shown for US Patent 6,863,745 and the instant invention are shown below.

	<u>US Patent 6,863,745</u> (claim 9)	<u>Instant Invention</u>
1 <sup>st</sup> Step	quenching after heating to 1000-1200°C	quenching after heating to 1000-1200 °C
2 <sup>nd</sup> Step	extruding after heating to 600-800°C	extruding after heating to 600-800°C
3 <sup>rd</sup> Step	rolling at 560-620°C	rolling between 560-620°C
4 <sup>th</sup> Step	final heat treatment of 560-620°C	final heat treatment between 560-620°C

If the same composition were subject to the same processing conditions, then an intermetallic compound size not exceeding 200 nm would be expected in both US Patent 6,863,745 and the instant invention. MPEP 2112.01 I.

#### *Response to Arguments*

Applicant's arguments filed 27 May 2008 have been fully considered but they are not persuasive.

First, the Applicant primarily argues that there is no teaching or motivation to combine the sulfur of Rebeyrolle et al. ('050) with Mardon et al. ('995) because the sulfur is added to in Rebeyrolle et al. ('050) in order for optimum improvement in creep and uniform corrosion resistance and in nodular-corrosion resistance and Mardon et al. ('995) already addresses exactly these concerns by providing a lower iron level.

In response, the Examiner notes that although Mardon et al. ('995) discloses that it would be important not to exceed an iron content of 250 ppm because high temperature creep would drop off sharply (col. 2, lines 10-14) and that the alloys of Mardon et al. ('995) would have generalized corrosion resistance comparable to that of

Art Unit: 1793

known Zr-Nb alloys and hot creep strength much better than that of known alloys and comparable to that of the best Zircaloy 4 alloys, Rebeyrolle et al. ('050) specifies tripling the creep resistance by increasing the sulfur content to 10 ppm (col. 4, lines 9-13) and significantly reinforcing the zirconium matrix (col. 4, lines 33-38), whereas Mardon et al. ('995) is silent with respect to these results due to the limiting of the iron content in the zirconium alloy.

Second, the Applicant primarily argues that the sponge material quantities listed in Easterday are not necessarily representative of the zirconium found in Mardon et al. ('995). The Applicant further argues that Mardon et al. ('995) has very low iron levels and the combination of iron, chromium, and vanadium in Easterday far exceeds the limits in Mardon et al. ('995) and the concentrations once the alloy has been made are not disclosed in Easterday.

In response, the Examiner notes that Mardon et al. ('995) discloses 50 to 250 ppm iron in addition to unavoidable impurities (col. 3, lines 1-8). Easterday discloses that 200 to 2800 ppm iron, 20 to 50 ppm vanadium, and 20 to 450 ppm chromium (Table III). The instant claims recite 200 to 700 of iron, chromium, and vanadium. The content of iron in Easterday overlaps the content of iron in Mardon et al. ('995) in addition to that of the instant invention. The Examiner asserts that Mardon et al. ('995) does not specify removing the impurities and therefore one skilled in the art would expect the presence of 20 to 50 ppm vanadium and 20 to 450 ppm chromium, as evidenced by Easterday.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse Roe whose telephone number is (571) 272-5938. The examiner can normally be reached on Monday-Friday 7:30 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1793

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John P. Sheehan/  
Primary Examiner, Art Unit 1793

JR

<b>Application Number</b> 	<b>Application/Control No.</b>	<b>Applicant(s)/Patent under Reexamination</b>
	10/728,239 <b>Examiner</b> Jessee Roe	MARDON ET AL. <b>Art Unit</b> 1793